

### **REMARKS**

Claims 1-8 are pending. Claims 1 and 5 have been withdrawn from consideration. Claims 2-4 and 6-8 are rejected. Claims 2 and 6 are amended and claims 9-15 added. Support for the amendments can be found throughout the application, for instance in the specification including page 7 (lines 4-7) and claims as originally filed. No new matter is added. Claims 2-4 and 6-15 are submitted for further consideration at this time. Applicants respectfully request reconsideration and withdrawal of all rejections.

### **Claim Rejections - 35 U.S.C. 102/103**

Claims 2, 3 and 6-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Noda et al. It is alleged that Noda et al. discloses each and every element of the claimed invention.

Applicants respectfully disagree. The present invention as set forth in claim 2 concerns a polymerization process of one or more fluorinated monomers wherein the perfluorodiacylperoxides according to claim 1 are used as polymerization initiators; wherein said perfluorodiacylperoxides meet the following condition: the thermal decomposition constants  $K_d$  ( $\text{sec}^{-1}$ ) in the presence of water do not undergo substantial variations with respect to the thermal decomposition constants in absence of water.

Applicants emphasize that the invention of claim 2 is concerned with a process for polymerizing fluorinated monomers in the presence of perfluorodiacylperoxide initiators of formula (A) having perfluorinated end groups with branched structure, which

satisfy the condition that the thermal decomposition constants  $K_d$  ( $\text{sec}^{-1}$ ) in the presence of water do not undergo substantial variations with respect to the thermal decomposition constants in absence of water. It is to be noted that with the perfluorodiacylperoxide initiators of formula (A), it is now possible to address the technical problems of (i) providing initiators that are not hydrolyzed by water at the corresponding temperature of thermal decomposition, (ii) conferring improved yield to aqueous polymerization processes due to the absence of secondary reactions often provoked by hydrolysis of peroxide initiators, and (iii) obtaining polymers having stable end groups as perfluoroalkyl groups due to the perfluorinated structure of the initiators.

Noda et al. discloses a process for polymerizing tetrafluoroethylene (TFE) and hexafluoropropene (HFP) in the presence of water by using di(fluoroacyl) peroxide initiators of formula:  $X_1-C_mF_{2m}-C(O)-O-O-C(O)-C_nF_{2n}-X_2$ , wherein  $X_1-C_mF_{2m}-$ ,  $X_1-C_mF_{2m}-$  is a (per)fluorinated end group, wherein  $X_1, X_2 = Cl, H, F$  in the presence of perfluoroalkyl carboxylic acids that render constant the initiator efficiency which is generally not constant due to its tendency to be easily hydrolyzed (page 2, lines 15-26). It is pointed out that the working examples of Noda et al. exemplify only (omega hydrododecafluoroheptanoyl) peroxide having a linear fluorinated structure.

Applicants therefore submit that the claimed invention is neither taught nor suggested by Noda et al. Applicants wish to point out in particular that the perfluorodiacylperoxide initiators (A), where  $R_f$  and  $R_f = \text{perfluorooxyalkyl}$  groups at terminal ends, are not encompassed by the general formula of Noda et al. which provides only perfluoroalkyl chain substituents. Moreover, while it may be alleged that the perfluorodiacylperoxide initiators (A), where  $R_f = R_f = CF_3$  at terminal ends (i.e.,

$[(CF_3)_2CFCOO]_2$ , may be disclosed by Noda et al., Applicants respectfully point out that the use of such a compound in aqueous polymerization, as well as such use of the compound in the absence of a stabilizer as discussed below, finds no teaching or suggestion in Noda et al.

Applicants also wish to point out that the claimed polymerization process is distinguished from Noda et al. in that the claimed process requires no stabilizers in aqueous medium, for example perfluoroalkyl carboxylic acids, in connection with the perfluorodiacylperoxide initiators (A). In contrast, such stabilizers are essential to Noda et al. for carrying out an aqueous polymerization. It is to be noted that as set forth in claim 2, the claimed perfluorodiacylperoxide initiators (A) demonstrate high hydrolytic stability since the thermal decomposition constants  $K_d$  ( $\text{sec}^{-1}$ ) in the presence of water are not substantially different with respect to the thermal decomposition constants in absence of water

In addition, Applicants wish to make clear that the claimed invention cannot be considered obvious over Noda et al. since those of ordinary skill in the art would find in the reference no teaching or suggestion that the claimed perfluorodiacylperoxide initiators (A) with perfluorinated branched end groups could be used to polymerize fluorinated monomers without stabilizers. Indeed, those of ordinary skill in the art would recognize Noda et al. as teaching away from the claimed invention, since the di(fluoroacyl) peroxides initiators of Noda et al. require stabilizers when used in the aqueous polymerization of fluorinated monomers. In view of Noda et al., those of ordinary skill in the art would not expect that di(fluoroacyl) peroxides could be used in the aqueous polymerization of fluorinated monomers in the absence of stabilizers. In

fact, Applicants have demonstrated that, in the absence of stabilizer, the yield of polymerization of PVDF is 90% (Example 4) when using the claimed perfluorodiacylperoxide initiators (A), that is the branched  $[(CF_3)_2CFCOO]_2$ , whereas the yield of PVDF is only 16% (Comparative Example 9) when using the homologous di(fluoroacyl) peroxide  $[CF_3CF_2CF_2COO]_2$ , not found in the claimed invention, but taught by Noda et al.

Therefore, in that Noda et al. fails to teach or suggest each and every element of the claimed invention, the rejection should be withdrawn.

Claim 4 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Noda et al.

Applicants respectfully disagree. Applicants point out that claim 4 is dependent on claim 2. As discussed above, the invention of claim 2 is neither anticipated nor obvious over Noda et al. Thus, by virtue of at least dependency on allowable claim 2, claim 4 is neither anticipated or obvious over Noda et al. Applicants would also like to point out that the claimed peroxide  $[(CF_3)_2CFCOO]_2$  of claim 4 finds no specific teaching or suggestion in Noda et al. It should be considered that there is no motivation in Noda et al. for those of ordinary skill in the art to select a peroxide of formula  $[(CF_3)_2CFCOO]_2$  wherein  $n = 3$  and  $X_1 = F$ , from among all of the di(fluoroacyl) peroxides encompassed by the formula of Noda et al. where  $m, n$  is able to range from 3 to 8 and  $X_1 = F, H, Cl$ . In addition, those of ordinary skill in the art would recognize no motivation in Noda et al. to use the disclosed peroxides in the polymerization of fluorinated monomers in aqueous medium in an absence of fluorinated stabilizers. In sum, the cited reference fails to teach or suggest the claimed invention and the rejection should be withdrawn.

Claims 2-4 and 6-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al.

Applicants respectfully disagree. The claimed invention is discussed above.

Nakamura et al. discloses a cyclic polymerization process of fluorine-containing monomers in aqueous medium or in suspension where an initiator is used. Suitable initiators may be selected from the following classes: azo-compounds, organic peroxides, inorganic peroxides. Light, rays, ionizing radiation and heat may also be used as an initiator. Nakamura et al. includes di-perfluorobutanoic peroxide among a long list of different initiators. In addition, Examples 3-6, 10-15 and 17-18 disclose  $[\text{C}_3\text{C}_7\text{COO}]_2$  as a peroxide initiator.

However, Nakamura et al. is unable to teach or suggest the claimed invention. Applicants urge in particular that Nakamura et al. fails to teach or suggest the claimed perfluorodiacylperoxide initiators (A) in the polymerization of fluorinated monomers, because the reference discloses and exemplifies only the di-perfluorobutanoic peroxide  $[\text{C}_3\text{C}_7\text{COO}]_2$  having a linear structure. In other words, Nakamura et al. fails to teach or suggest the composition (A)  $[(\text{CF}_3)_2\text{CFCOO}]_2$ , as claimed, having branched end groups. Applicants point out, as also commented above with respect to Examples 4 and 9, that the use of a linear structure such as  $[\text{CF}_3\text{CF}_2\text{CF}_2\text{COO}]_2$  is not the equivalent of using a branched structure such as  $[(\text{CF}_3)_2\text{CFCOO}]_2$ , even if it could be alleged that the two peroxides have similar structure, since the different structures (e.g., linear versus branched) result in very different tendencies concerning hydrolysis and vastly different yields of polymerization, as has been discussed above.

Therefore, in that the cited reference is unable to teach or suggest the claimed invention, Applicants urge withdrawal of the rejection.


### **Double Patenting Rejection**

Claims 2-4 and 6-8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over co-pending Application No. 10/128,411. Applicants respectfully traverse this rejection. Applicants wish to first point out that the a double patenting rejection must be based on the claims (not the abstract and title) of the co-pending Application. Thus, the rejection is improper. Nevertheless, Applicants note that despite the allegations at page 5 of the Office Action, the co-pending Application does not concern any polymerization process in accordance with the claimed invention. Applicants therefore urge withdrawal of all rejections.

In view of the amendments and remarks above, Applicants submit that this application is in condition for allowance and request favorable action thereon.

In the event this paper is not timely filed, applicants hereby petition for an appropriate extension of time. The fee for this extension may be charged to our Deposit Account No. 01-2300, along with any other additional fees which may be required with respect to this paper referencing Attorney Docket No. 108910-00056.

Respectfully submitted,  
ARENT FOX KINTNER PLOTKIN & KAHN, PLLC



Hans J. Crosby  
Attorney for Applicants  
Registration No. 44,634

GROUP 1700

AUG 07 2003

FAX RECEIVED

Customer No. 004372  
1050 Connecticut Avenue, N.W., Suite 400  
Washington, D.C. 20036-5339  
Tel: (202) 857-6000  
Fax: (202) 638-4810

HJC/ccd

OFFICIAL